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COMPLETE SPECIFICATION.

Improvements in or relating to Apparatus Using Photographic Roll-film.

We, KODAK LIMITED, a Company registered under the laws of Great Britain, of Kodak House, Kingsway, London, W.C.2 (Assignees of PAUL JUSTEN ERNISSE, a Citizen of the 5 United States of America, of 333, State Street, Rochester, New York, United States of America), do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a film take-up chamber for use in apparatus using photographic roll-film (hereinafter referred to as 15 "of the type specified"), such as a camera or optical projection apparatus of the type comprising a film supply chamber and a take-up chamber spaced apart on opposite sides of a camera exposure frame or projector film gate, 20 means being provided by which a film strip inserted in the supply chamber may be propelled through a film guideway across the exposure frame or film gate to the take-up chamber, where it is loosely coiled for temporary storage before being returned to the supply chamber for removal from the apparatus.

Apparatus of the type specified have the advantage that they may be quickly loaded 30 and rapidly operated, but it is frequently difficult to cause the loose coil of film to move smoothly and without considerable friction. If the take-up chamber comprises a cylindrical container of greater length than the 35 width of the film, it is found that, after a few convolutions of the film have been wound into the container, the film binds against the wall thereof, thus making further movement difficult, if not impossible, and likewise causing 40 scratching of the film. In order to overcome this disadvantage, it has been proposed to use leaf springs coiled in a generally inward direction, in such manner that the springs may expand as additional convolutions of film 45 pass into the container. This is more desirable than no film guide at all, but it is nevertheless possible for scratching of the film

surface to occur in many instances, since one film surface may be pushed inwardly against a spring so that the picture area may become 50 scratched.

It is an object of this invention to provide a film take-up chamber for photographic apparatus of the type specified which will eliminate all possibility of the film surface 55 being scratched.

According to this invention, a film take-up chamber for use in apparatus of the type specified comprises an enclosure having a pair of opposite end walls spaced apart to 60 receive a film therebetween, wherein one end wall is fixed and the other is movable towards or away from said fixed wall, and wherein one of the two walls includes an inclined portion which, when a film is fed into the chamber, 65 engages an edge of the film to guide the latter into a coil in the take-up chamber in such manner that the coil is supported solely by the edges of the film.

In order that the invention may be more 70 readily understood, reference is made to the accompanying drawing, wherein:—

Fig. 1 is a sectional view through a camera including a take-up chamber constructed in accordance with the invention; 75

Fig. 2 is an enlarged detail section taken on the line II—II of Fig. 1 with the end of a film approaching the take-up chamber;

Fig. 3 is a view similar to Fig. 2, but shown with the film after entering the take-up chamber;

Fig. 4 is a view similar to Fig. 3, but with a number of film convolutions shown wound into the take-up chamber; and

Fig. 5 is a fragmentary perspective view 85 partially in section, showing the take-up chamber from the rear.

While the take-up chamber according to the invention is equally adapted for use in different types of apparatus using photographic roll-film, such as cameras, film projectors, film viewers and the like, it has been illustrated by way of example, as applied to a photographic camera, which

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shown in Fig. 1, comprises a body portion 1 having a supply spool chamber 2 and a take-up chamber 3 arranged on opposite sides of an exposure frame 4. The front wall 5 of 5 the camera supports an objective in the usual mount 6, and a film passageway 7 leading from the supply chamber 2 to the take-up chamber 3 is equipped with a known type of presser plate 8 pressed forwardly by springs 10 9 to hold the film flat over the exposure frame. A film "F" is supplied on a spool or in a cassette 10 and one end of the film is attached in known manner to a hub member 11 turned by a winding key 12 through a 15 knob or handle 13 on the outside of the camera. The other end "E" of the film may be tapered, as shown in Fig. 2, and is propelled through the passageway 7 and into the take-up chamber 3 by turning the knob 20 13.

The improved film take-up chamber 3 according to the invention is here shown as having a generally cylindrical wall 15 with a film entry aperture 16 leading to the chamber from the film passageway 7. This aperture 16 is best shown in Fig. 5 and it extends upwardly at 18 through a cap-like member 19 forming a movable end wall of the chamber, such member 19 being concave with 30 respect to and capable of moving axially of the fixed bottom wall 20.

A light spring 21 normally urges the cap member 19 downwardly, as viewed in Figs. 2-5, and projections 22 and 23 on the member engage in slots 24 and 25 formed in the circular wall 15, so that the movable wall may move axially, but cannot turn. When in its lowermost position, an edge 26 of the cap member 19 engages a shoulder 27 on the 40 wall 15. The combined length of the slots 18 and 16 is greater than the width of a film, so that when the end of the film "E" engages the slot 16 and passes into the film take-up chamber, there is always a sufficiently wide 45 slot to permit its passageway even when the length of the chamber is at its minimum, as shown in Fig. 2. When the film "E" is propelled into the take-up chamber 3, the upper edge of the film "F" engages an inclined 50 wall 30 of the movable cap member 19. While this wall may be a conical frustum, as shown in Fig. 2, it is obvious that it may also be of other shapes such as, for example, a cap of a sphere, because the purpose of the inclination is to cause the film end "E" to contact with such wall only along the extreme upper edge of the outer convolution of film, as shown in Fig. 4, while the lower edge of the film convolutions rest on the fixed bottom wall 20 60 of the chamber. It is this guiding of the upper edge of substantially the whole outer convolution by a concave-shaped wall which is responsible for a smooth movement of the film strip throughout the entire coiling operation.

As the film "F" is propelled into the take-up chamber 3, each successive convolution merely raises the cap-like movable wall 19 so that it may move upwardly against the pressure of the spring 21. Thus, the length 70 of the film take-up chamber is directly controlled by the number of convolutions in such chamber and the convolutions of film will always be held away from the cylindrical wall of the chamber. 75

Thus, a strip of film may be propelled into and removed from the improved form of take-up chamber according to the invention without any tendency on the part of the film to bind, since each additional convolution, which 80 increases the outside diameter of the convolutions, merely causes the movable wall 19 to move upwardly against the pressure of spring 21. Since the movable wall 19 cannot turn, the slots 16 and 18 are always held in position to permit the passage of film. 85

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:— 90

1. A film take-up chamber in or for an apparatus of the type specified, and comprising an enclosure having a pair of opposite end walls spaced apart to receive a film therebetween, wherein one end wall is fixed and the other is movable towards or away from said fixed wall, and wherein one of the two end walls includes an inclined portion which, when a film is fed into the chamber, engages an edge of the film to guide the latter into a 100 coil in the take-up chamber in such manner that the coil is supported solely by the edges of the film.

2. A film take-up chamber according to Claim 1, wherein the inclined portion for engaging an edge of the film comprises a smooth surface on one end wall which is concave with respect to the opposite end wall of the take-up chamber and has portions disposed closer to the fixed end wall than the width of the 110 film, whereby a film coil in the take-up chamber is spaced from the walls of the enclosure except for the relatively movable and fixed walls engaging the edges of the film.

3. A film take-up chamber according to Claims 1 or 2, including means for guiding the movable wall for movement towards and away from the fixed wall, and a spring tending to move the former towards the latter but allowing movement of the movable wall away 120 from the fixed wall when the size of the film coil increases as film is propelled into the take-up chamber.

4. A film take-up chamber according to Claims 2 or 3, wherein the concave wall is 125 the movable wall.

5. A film take-up chamber according to Claim 4, wherein a film passage slot is formed in the enclosure, such slot extending at least through a part of the movable wall. 130

- 5 6. An apparatus of the type specified, including a film take-up chamber according to any of the preceding Claims 1-5.
7. An apparatus of the type specified including a film take-up chamber constructed

substantially as hereinbefore described with 10 reference to the accompanying drawing.

Dated this 19th day of October, 1949.  
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Acting for the Applicants.

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